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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/882,534

06/14/2001

Garo J. Derderian

MI22-1752

8714

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12/16/2003

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EXAMINER

THOMAS, TONIAE M

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 12/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/882,534

Applicant(s)

DERDERIAN ET AL.

Examiner

Toniae M. Thomas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 32-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 32-52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. This action is an official response to the response filed on 17 September 2003.

Currently, claims 32-52 are pending.

2. The indicated allowability of claims 34, 35, 38, 39, 42, 43, 47, and 48 is withdrawn in view of the newly discovered references to Emesh et al. (US 5,452,178) and Derderian et al. (US 6,458,416). A rejection based on the newly cited references follows.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. *Claims 32-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Emesh et al. (US 5,452,178) and Derderian et al. (US 6,458,416 B1).*

The Emesh et al. patent (Emesh) discloses a memory array (figs. 3, 5-12 and col. 6, line 58 – col. 9, line 62). The memory array comprises the following elements: a plurality of capacitor constructions (col. 1, lines 11-15), each having a first capacitor electrode 54 over a substrate 52 (fig. 3 and col. 7, lines 3-6), wherein the substrate is a monocrystalline silicon wafer (col. 6, lines 58-62); a capacitor dielectric layer 66 over the first electrode (fig. 3 and col. 7, lines 8-13); a second capacitor electrode 68 over the dielectric layer (fig. 3 and col. 7, lines 20-23); and an insulative barrier layer 64 to oxygen

diffusion between the first and second electrodes (col. 7, lines 13-16). The barrier layer 64 is over the first electrode 54, and the second electrode 68 is over the dielectric layer 66 and the barrier layer (fig. 3). The barrier layer 64 comprises Al_2O_3 (col. 9, lines 25-29), which exhibits a k factor of greater than 7 at 20°C.

Emesh does not teach the Al_2O_3 insulative barrier layer is an atomic layer deposited (ALD) insulative barrier layer.

The Derderian et al. patent (Derderian) discloses a method for depositing an Al_2O_3 using atomic layer deposition (ALD) (col. 3, lines 5-8 and col. 5, line 40 – col. 6, line 38). The Al_2O_3 layer comprises a chemisorption product of first and second substantially saturated precursor monolayers, wherein the precursors are different (col. 2, lines 41-57 and col. 5, line 40 – col. 6, line 38).

Since Emesh and Derderian are from the same field of endeavor, the purpose disclosed by Derderian would have been recognized in the pertinent art of Emesh by one of ordinary skill in the art at the time the invention was made.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify Emesh by using an ALD technique to deposit the Al_2O_3 insulative barrier layer 64, as taught by Derderian, since ALD is recognized as a deposition technique that forms high quality materials with minimal defects (Derderian – col. 1, lines 9-11).

Emesh does not teach that the Al_2O_3 insulative barrier layer 64 has a thickness of less than about 12 Å. However, it would have been obvious to one of ordinary skill in

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the art at the time the invention was made to form the Al_2O_3 layer such that its thickness is less than 12 Å, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233). Furthermore, one having ordinary skill in the art would have been motivated to form the Al_2O_3 layer to a thickness of less than 12 Å, so that the insulative barrier layer 64 is relatively thin.

Response to Arguments

4. Applicant's response, filed 17 September 2003, with respect to the rejections of claims 32, 33, 36, 37, 40, 41, 44-46, 49-51 under 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejections have been withdrawn. However, upon further consideration, a new ground of rejection is made in view of Emesh et al. (US 5,452,178) and Derderian et al. (US 6,458,416).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toniae M. Thomas whose telephone number is (703) 305-7646. The examiner can normally be reached on Monday through Thursday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (703) 308-4905. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

TMT

December 10, 2003



AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800